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RECENT INVESTIGATIONS BEARING ON THE QUESTION OF THE OCCURRENCE OF NEOCENE MAN IN THE AURIFEROUS GRAVELS OF THE SIERRA NEVADA

BY
WM. J. SINCLAIR

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CONTENTS

Introduction.

The question of the early existence of man in California, and of the occurrence of his remains in the gold-bearing gravels beneath the lava flows on the western slope of the Sierra Nevada, originated from the work of the Geological Survey of California under Professor J. D. Whitney. A large part of the evidence on which the affirmative view is based is presented in Whitney's memoir on the auriferous gravels.[1] Several writers have contributed to the discussion since the publication of that work, but a comparatively small amount of geological evidence has been presented either for or against specific instances of man's occurrence in these deposits.

In working on the general problem of the time of man's appearance in the Californian region, the Department of Anthropology of the University of California has taken up, as a necessary part of the investigation, a review of the evidence relating to the so-called auriferous gravel relics. The writer was commissioned to visit the localities where the discoveries of human remains reported by Whitney and others were made, and to compare the geological conditions found there with such intrinsic evidence as is presented by the artifacts and bones preserved. Several months were spent during the summer of 1902 in studying the various occurrences of auriferous gravels in Tuolumne, Calaveras, and Eldorado counties, which comprise the majority of the classic localities where human remains are said to have been discovered. Though the results of the writer's work are largely of a negative character, it is considered advisable to present them as a portion of the general report on the studies on the antiquity of man in this region now being carried on by the department.

The excellent maps of the United States Geological Survey render any general discussion of the distribution and stratigraphy of the gold-bearing gravels unnecessary. As pointed out by Lindgren,[2] the gravels mapped as Neocene by the survey, on the

[1] The Auriferous Gravels of the Sierra Nevada of California. Mem. Harvard Mus. Comp. Zool. Vol. VI, 1880.

[2] U. S. Geol. Atlas, Colfax Folio, Descriptive Text.

atlas sheets of the California gold belt, are of several quite distinct ages with reference to the rhyolitic and andesitic lava flows. "The auriferous gravels proper may be divided into (1) the deep gravels, (2) the bench gravels, (3) the gravels of the rhyolitic epoch, (4) the gravels of the intervolcanic erosion epoch, (5) the gravels of the andesitic tuff." The bench gravels "often contain a predominating amount of quartz pebbles, but no andesite or rhyolite." Those of the intervolcanic erosion epoch "contain pebbles of the Bed-rock series and of andesite and rhyolite."[3] To these may be added a sixth division, the post-andesitic stream gravels which contain pebbles of the Bed-rock series and of all the lavas—rhyolite, andesite, and latite.

It is to be noted that Whitney, while recognizing that the gravels described by him differed in age and in their relation to the intercalated volcanic flows, made no attempt to specify from which gravel the human remains reported by him were obtained, grouping all under the general term auriferous gravels. Some such division of the gravels as that proposed by Lindgren must be kept in mind in the treatment of the question of man's occurrence in these deposits. The lithological characters of the gravels are important in a discussion of the rock types represented in the various implements reported from them.

In examining the region the writer studied the majority of the classic localities mentioned by Whitney and others. Little could be gained by attempting an investigation of all the localities, as in most cases the description is given in such general terms that an identification of the exact localities is impossible. This is particularly applicable to regions of hydraulic mining.

Evidence Favoring the Occurrence of Human Remains in the Gravels.

The evidence favoring the occurrence of man in the auriferous gravels may be subdivided into three classes: (1) human remains reported from hydraulic mines; (2) human remains found in place in undisturbed gravel; (3) human remains from drift mines.

[3] Lindgren, loc. cit.

Human Remains from Hydraulic Mines.—Various stone relics are said by Whitney to have been found in placer mines in different parts of the gravel region. Several of these implements are said to have been associated with bones of the mastodon and other extinct vertebrates. Most of them were found at considerable depths and in one or more instances are said to have been covered by a deposit of calcareous tufa several feet thick.

Human Remains in Place in Undisturbed Gravel.—A broken pestle was found by Clarence King, the geologist, in 1869, in place in a gravel bank exposed by a recent wash, close beneath the latite cap of Table Mountain in Tuolumne County. The implement was firmly imbedded and when dislodged left the impression of its shape in the gravel matrix.

Human Remains from Drift Mines.—There is a large amount of evidence based on the reported occurrence of human remains in the gravels buried beneath the basaltic, andesitic, and rhyolitic lava flows. These gravels are reached by vertical shafts and by horizontal and inclined tunnels termed drifts. The published evidence consists of statements and affidavits by persons who were either operating the mines and made the discoveries, or who were more or less cognizant of the facts in the case at the time when the relics were found. The relics recovered and preserved consist of stone implements and human bones. To one of the latter finds, the so-called Calaveras skull, great interest attaches because the bone has lost its organic material and has taken on the appearance of a true fossil. It has been claimed that the matrix investing the skull is of the same character as the gravel of the mine where the specimen was found.

Review of the Evidence in Detail.

The vast majority of occurrences reported from placer mines can no longer be verified. In addition to the confusion arising from lack of classification as to age of beds involved, Professor W. H. Holmes[4] has shown that there is a strong probability that a large proportion, if not all, of the stone implements reported

[4] Review of the Evidence Relating to Auriferous Gravel Man in California. Am. Anthropologist Jan. and Oct., 1899; Smithsonian Rept. for 1899, pp. 419-472, Plates 1-16, Washington, 1901.

from gravels worked by the hydraulic method have fallen into the mine from recent Indian village sites situated on bluffs above the mine pits, owing to the recession of the gravel bank under the attack of the hydraulic giant. There should also be kept in mind the possibility of accidental burial in the flood plain of a recent stream working over gravels of all ages. Wood's Creek near Jamestown may be taken as an example, from which Whitney reports implements at depths of from twenty to forty feet.

Human Remains from Gold Springs, Kinkaid Flat, and Shaw's Flat.—Whitney reports a number of implements from these localities. Of these, the following from the Voy collection preserved in the museum of the University of California may be mentioned:

(*a*) Original No. 12[5] Voy coll. (1–4205.)* A mortar with diagonal groovings said to have been found in 1863, "near other relics and animal remains imbedded in auriferous gravel mixed with calcareous tufa, at a depth of about sixteen feet beneath the surface" in the vicinity of Gold Springs. The material of this mortar is a pinkish hornblende andesite.

(*b*) Orig. No. 13[6] Voy coll. (1–4197.) An oval dish or mealing stone of hornblende andesite, said to have been found in 1862 in Gold Spring Gulch, Tuolumne County, "in auriferous gravel beneath an accumulation of about twenty feet of calcareous tufa."

(*c*) Orig. No. 16 Voy coll. (1–4204AB.) A mortar and pestle said to have been found in 1863, associated with other stone relics and bones of the mastodon, etc., in auriferous gravel about sixteen feet below the surface, in Gold Springs Gulch. The mortar is of hornblende andesite.

(*d*) Orig. No. 10 Voy coll.† A mortar of diorite porphyry said to have been found at Shaw's Flat in 1863, in auriferous gravel about fourteen feet below the surface.

[5] Referred to by Whitney, Aurif. Grav. p. 263, figured by Holmes, loc. cit. Am. Anth. Pl. VI.

* The numbers in parentheses are the catalogue numbers of the Museum of the Department of Anthropology of the University of California. The original Voy numbers have been employed in this paper since they have already been cited by other authors.

[6] Referred to by Whitney, Aurif. Grav. p. 263, figured by Holmes, loc. cit. Am. Anth. Pl. VI.

† This specimen has not been located in the Museum.

(*e*) Orig. No. 9[7] Voy coll. (1–4208AB.) A mortar of pinkish hornblende andesite, and a pestle of amphibolite schist, said to have been found in 1861 in auriferous gravel at a depth of sixteen feet, at Kincaid Flat.

The gravels at Springfield and Columbia, which are also given as localities affording human remains, are similar to those at Gold Springs, Shaw's Flat, and Kincaid Flat, and one description will apply to all. Usually they are not well-worn stream-washed pebbles like those characterizing the Neocene channels, but subangular fragments largely of vein quartz or quartzite. The underlying Carboniferous lime-stone has been eroded into fantastic shapes by percolating waters during or after the deposition of the auriferous wash. The mammalian fauna listed by Whitney from these localities (mastodon, elephant, bison, and the horse *E. occidentalis*) indicates a Pleistocene age for at least a part of the deposit, although some of it is certainly older. In a limestone region with underground drainage, it is quite apparent that implements of human manufacture which happened to be scattered on the surface would stand an excellent chance of reaching deeper levels through the many sink holes affording drainage ways to surface waters. That this is true for some of the animal remains is shown by Leidy's[8] identification of teeth of the recent horse from depths of twenty-five and twenty-nine feet in the gravels at Kincaid Flat. Before mining was begun, these flats were covered with a growth of oaks and were probably advantageous village sites.

The calcareous tufas on the Grant ranch at Gold Springs are all of Pleistocene or recent origin. They have been deposited by large springs, one of which has at present a steady discharge of fifty miner's inches. The tufa deposit conforms to the drainage slopes possessed by the present topography. It is sometimes fine and powdery, but may assume a radiate crystalline and a shelly facies. Intercalated with and underlying the tufa are shallow deposits of subangular gravels which have been worked for gold. These gravels appear to have been formed by the waters from the

[7] Referred to by Whitney, Aurif. Grav. p. 263, figured by Holmes, loc. cit. Am. Anth. Pl. VI.

[8] Aurif. Grav. p. 257.

same springs which deposited the tufas. There is no available means for determining the rate of accumulation of these deposits. The springs have shifted their points of discharge since the tufas were formed and are not now depositing this substance at a rapid rate. It is of course impossible to determine the nature of the association of the implements with these tufas and gravels, or to locate the place where they were found. The only available information is that conveyed by Whitney and by the labels on Voy's collection. It is known however that Voy obtained his specimens from this locality at second hand, from persons who probably claimed to have found them as described.

The implements from these localities afford no inherent evidence of antiquity. They are of the same type and material as those found on old Indian sites.

Human Relics from Murphys.—The detrital material filling crevices in the limestone in the vicinity of Murphys is also a reputed source of human relics. While some of this material is Pleistocene, other portions are recent and some of it may antedate the Pleistocene. In the absence of detailed information regarding the exact localities where the implements were found, these occurrences may be passed without further comment.

The King Pestle.—The only account of the occurrence of human relics in the gravels which has gone practically unchallenged is that published by Dr. Becker[9] regarding the discovery by Clarence King of a broken pestle in the andesitic gravels and sands close beneath the latite cliff of Table Mountain. The locality is given as that part of the mountain lying a couple of miles southwest of Tuttletown. This would be above Rawhide. The implement was dislodged from hard gravel, leaving behind a cast of its shape in the matrix. The relic is a portion of a pestle of fine grained diabase, the end highly polished by wear in the hand. As a geologist, Mr. King was a reliable observer and able to determine whether or not the implement was in place and formed an integral part of the mass of gravel in which it was imbedded. Secondary cementation does not seem to have been taken into consideration. On many of the outcrops of andesitic sandstone in the vicinity of this locality, secondary cementation is

[9] Bull. Geol. Soc. Am. Vol. 2, p. 193.

in progress, indurating the soft sands into a hard rock to the depth of at least an inch. It is unfortunate that the matrix containing the impression of this relic was not preserved. As it is, there is no way of confirming the discovery. We have nothing but the specimen and the published account to work from. An examination of the locality yielded little of value in this connection. Immediately beneath the latite are coarse andesitic breccias with an occasional water-worn pebble. Farther down are gravels and sands. Holmes[10] reports finding "Digger" mealing stones scattered over the slope.

Human Relics from the Table Mountain Drift Mines.—The following occurrences of human implements and bones in the gravels pierced by deep tunnels extending beneath Table Mountain are mentioned by Whitney:

(*a*) A human jaw and a stone muller in the collection of Dr. Snell. Both objects are said to have been taken from under Table Mountain. The exact localities are not stated. Both have probably been, long since, lost or destroyed.

(*b*) A fragment of a human skull from the Valentine shaft on the Columbia claim, a little south of Shaw's Flat. Portions of this specimen were given to the museums of the Boston Natural History Society and the Philadelphia Academy of Natural Science. The specimen is said to have come from a depth of one hundred and eighty feet, from beneath a series of strata comprising in descending order surface soil, pipe clay, "cement" with leaf impressions and gravel. It was taken from the sluice in which gravel from the mine was being washed. In addition to the bone, a mortar is said to have been found in these workings in the gravel.

(*c*) A white marble bead from the Sonora tunnel. The specimen was taken from a carload of gravel coming out of the tunnel. When found it is said to have been incrusted with pyrite.

(*d*) A mortar from the Boston tunnel, found by Llewellyn Pierce.

(*e*) A human skeleton from a tunnel under Table Mountain. No further particulars are given.

(*f*) A perforated cutting implement and several stone mor-

[10] Loc. cit. Am. Anth., p. 622.

tars from the Stanislaus Co.'s claim at O'Byrns' Ferry, Tuolumne Co. The relics were found "from sixty to seventy-five feet from the surface in gravel, under the basalt and about 300 feet in from the mouth of the tunnel."

For several of these occurrences there are absolutely no data on which to base an investigation, nor any attendant circumstances to establish their validity as evidence. The relics in the Snell collection are lost. No particulars are furnished regarding the skeleton. The implements from O'Byrns' Ferry have not been preserved. The geological features of the locality are essentially the same as those of the more northerly parts of Table Mountain.

The position of the Valentine shaft was sought by the writer, but without success. Regarding the possibility of an external origin for the objects reported from this shaft, Whitney says: "The essential facts are, that the Valentine shaft was vertical, that it was boarded up to the top, so that nothing could have fallen in from the surface during the working under ground, which was carried on in the gravel channel exclusively, after the shaft had been sunk." In this connection it may be pointed out that many of the old drift mines south of Shaw's Flat were connected and that this system of galleries was ventilated by air shafts, so that the possibilities are not limited to one shaft, however securely that one may have been boarded.

The Sonora tunnel is an incline starting in andesitic sands and pipe clay beneath the latite near the intersection of the roads to Tuttletown and to Sonora via Shaw's Flat. It is said to connect with some of the deeper workings under Table Mountain. Little dependence, as an evidence of antiquity, can be placed on the presence of pyrite in the hollow of the marble bead reported by Whitney from the gravels of this mine. The rapidity with which secondary pyrite forms is well known. Calcium carbonate might act as a precipitating agent in salts of iron dissolved in the mine water.

The relics from the Valentine shaft and Sonora tunnel were not found in place in undisturbed gravel, but were taken in one case from the sluice in which gravel was being washed, and in the other from gravel brought out in the car. If this degree of

association with the gravel is to be accepted as proof of antiquity, we would be justified in supposing that any object of recent manufacture acquired under similar circumstances was as old as the gravels. Neither of these occurrences can be accepted as a valid proof of the antiquity of man.

Perhaps more importance has been attached to the mortar vouched for by Llewellyn Pierce, than to any of the preceding. The evidence for the antiquity of this relic is presented by Whitney in the following affidavit:[11]

Sonora, Tuolumne County, California,
December 28th, 1870.

"This is to certify that I, the undersigned, have this day given to Mr. C. D. Voy, to be preserved in his collection of ancient stone relics, a certain stone mortar, which has evidently been made by human hands, which was dug up by me, about the year 1862, under Table Mountain, in gravel, at a depth of about 200 feet from the surface, under the basalt, which was over sixty feet deep, and about 1,800 feet in from the mouth of the tunnel. Found in the claim known as the Boston Tunnel Company. In these claims at various times there have also been found numerous bones of different animals."

(Signed) LLEWELLYN PIERCE.

The label accompanying this specimen, which is No. 6[12] of Voy's coll. (1–4209), places the depth from the surface at 340 feet, 140 feet of which is said to have been basalt.

Mr. Pierce, who resides about a mile above Jeffersonville, Tuolumne Co., was interviewed by the writer. During the course of this interview the following information was furnished by Mr. Pierce. The mortar from the Boston claim was as large as a sixteen-gallon milk bucket and would weigh about seventy-five pounds. It was found in hard gravel under the cement, and was taken out by Mr. Pierce while he was sitting on a candle box, breasting out gravel. The writer was shown a small oval tablet of dark colored slate with a melon and leaf carved in bas-relief. Mr. Pierce claimed to have found this in the same gravels as the mortar, and, he thought, probably at the same time. This tablet

[11] Aurif. Grav. p. 266.

[12] Figured by Holmes, loc. cit. Am. Anth., Pl. VII.

shows no signs of wear by gravel. The scratches are all recent defacements. The carving shows very evident traces of a steel knife blade and was conceived and executed by an artist of considerable ability. The mortar preserved in Voy's collection is an oval boulder of hornblende andesite into which a hole has been worked, about four and three-quarters inches in greatest width, and three and three-quarters inches deep, dimensions to which those of a sixteen-gallon bucket must be regarded as rather a liberal approximation. The deep gravels in the bottom of the Table Mountain channels, tapped by the Boston Tunnel and other workings, are largely inaccessible, but so far as known are not volcanic.[13] The incongruity of associating an andesitic mortar and a tablet engraved by steel tools, with the old prevolcanic gravels is at once apparent. The andesitic sands and gravels of Table Mountain lie above the auriferous channel gravels in which these relics were supposed to occur.

The Neale Discoveries.—Considerable information has been gathered by Becker[14] and Holmes[15] regarding the reported discovery of implements by Mr. J. H. Neale of Sonora, in the Montezuma Mine. It is desired here to compare these published statements with the story as told to the writer by Mr. Neale, and with the testimony of the locality. It will be necessary to quote at some length from the paper referred to. The affidavit published by Dr. Becker is as follows:

Sonora, August 2, 1890.

"In 1877 Mr. J. H. Neale was superintendent of the Montezuma Tunnel Company, and ran the Montezuma tunnel into the gravel underlying the lava of Table Mountain, Tuolumne County. The mouth of the tunnel is near the road which leads in a southerly direction from the Rawhide Camp, and about three miles from that place. The mouth is approximately 1,200 feet from the present edge of the solid lava cap of the mountain. The course of the tunnel is a little north of east. At a distance of between 1400 and 1500 feet from the mouth of the tunnel, or of between 200 and 300 feet beyond the edge of the solid lava, Mr. Neale saw

[13] Turner and Ransome, Sonora Folio. Explanatory text.
[14] Becker. Bull. Geol. Soc. Am. Vol. 2, p. 191.
[15] Holmes. Smithsonian Rept. for 1899, p. 450.

several spear-heads, of some dark rock and nearly one foot in length. On exploring further, he himself found a small mortar three or four inches in diameter and of irregular shape. This was discovered within a foot or two of the spear-heads. He then found a large well-formed pestle, now the property of Dr. R. I. Bromley, and near by a large and very regular mortar, also at present the property of Dr. Bromley.

"All of these relics were found the same afternoon, and were within a few feet of one another and close to the bed-rock, perhaps within a foot of it.

"Mr. Neale declares it utterly impossible that these relics can have reached the position in which they were found excepting at the time the gravel was deposited, and before the lava cap formed. There was not the slightest trace of any disturbance of the mass or of any natural fissure into it by which access could have been obtained either there or in the neighborhood.

"And Mr. J. H. Neale declares upon his oath that the foregoing statement is in every respect true."

(Signed) JOHN H. NEALE.

With this should be compared the statement published by Holmes:

"One of the miners coming out to lunch at noon brought with him to the superintendent's office a stone mortar and a broken pestle which he said had been dug up in the deepest part of the tunnel, some 1500 feet from the mouth of the mine. Mr. Neale advised him on returning to work to look out for other utensils in the same place, and agreeable to his expectations two others were secured, a small ovoid mortar, 5 or 6 inches in diameter, and a flattish mortar or dish, 7 or 8 inches in diameter. These have since been lost to sight. On another occasion a lot of obsidian blades, or spear-heads, eleven in number and averaging 10 inches in length, were brought to him by workmen from the mine. They had been found in what Mr. Neale called a 'side channel,' that is, the bed of a branch of the main Tertiary stream about a thousand feet in from the mouth of the tunnel, and 200 or 300 feet vertically from the surface of the mountain slope. These measurements were given as estimates only, but at the same time they

were, he felt sure, not far wrong. Four or five of the specimens he gave to Mr. C. D. Voy, the collector. The others also had been given away but all trace of them had been lost. Mr. Neale spoke enthusiastically of the size and perfection of these implements, and as he spoke drew outlines of long notched blades in the dust at our feet. Some had one notch, some had two notches, and others were plain leaf-shaped blades.''

''Desiring to find out more concerning these objects, he went on to say, he showed them to the Indians who chanced to be present, but, strangely enough, they expressed great fear of them, refusing to touch them or even speak about them; but finally, when asked whether they had any idea whence they came, said they had seen such implements far away in the mountains, but declined to speak of the place further or to undertake to procure others.''

The following statements by Mr. Neale regarding the discovery of these implements were taken down by the writer in the course of the interview: A certain miner (Joe), working on the day shift in the Montezuma tunnel, brought out a stone dish or platter about two inches thick. Joe was advised to look for more in the same place. At the time, they were working in caving ground. Mr. Neale went on the night shift and in excavating to set a timber, 'hooked up' one of the obsidian spear points. With the exception of the one brought out by Joe, all the implements were found personally by Mr. Neale, at one time, in a space about six feet in diameter on the shore of the channel. The implements were in gravel close to the bed-rock and were mixed with a substance like charcoal.

The large pestle and mortar mentioned by Becker are in the United States National Museum. The material of the mortar is andesite.

The geological conditions in the vicinity of the Montezuma mine are similar to those at other points along Table Mountain. The detrital deposits beneath the latite are not well exposed, but wherever seen are found to be andesitic breccias, gravels, sands, and pipe clay. The deep gravels lying in the center of the channel are believed to be prevolcanic, so that there is involved the anomaly of two late volcanic rock types, andesite and obsidian, occurring in the prevolcanic gravels.

The mouth of the Montezuma tunnel lies below the road leading south from Rawhide and as well as can be ascertained by rough measurements is about thirteen hundred and ninety feet from the base of the latite cliff, measured along the irregularities of the slope from the cliff to the mine. According to some accounts, it was intended as a drainage tunnel for the placer mines at Montezuma on the other side of the mountain. Both the old tunnel and the new one mentioned by Holmes[16] were found caved in and abandoned. There was every indication of a former Indian camp site in this vicinity. Half an hour's search resulted in the discovery of a pestle and a flat stone muller, a few yards north of the mine buildings. Similar discoveries were reported by Holmes. South of the tunnel, a large permanent mortar was found. The material of this mortar block is latite from the cliff above. It is quite possible that the implements mentioned by Mr. Neale came from this Indian camp site.

The McTarnahan Mortar.—In the discussion of Dr. Becker's paper, Rev. G. Frederic Wright mentioned the discovery of a mortar reported to him by Mr. C. McTarnahan, as follows:*

"The discovery was made in October, 1887, in the Empire mine. . . . This mine is on the western side of Table Mountain. . . . This mine lies nearly westward from Shaw's Flat, and, from the opening, penetrates the rim underneath Table Mountain a distance of 742 feet. Mr. McTarnahan himself found the mortar in the gravel, as work was proceeding, 500 feet from the outside of the rim, which, from the direction of the drift, would make it 200 feet from the apex of the rim under the surface of the basalt. He described the mortar as a granite boulder about eight inches in diameter, and the hollow four inches in diameter at the surface and three inches deep." Mr. Frank McTarnahan, who resides not far from the Empire mine, was interviewed by the writer regarding this relic. Both he and Mr. Charles McTarnahan, his brother, worked in the mine together. The only mortar found was discovered back of the lagging during the work of retimbering. The mine had been idle at least two years before the McTarnahans began work. The mortar was not in the gravels, but thrust in back of the lagging, as large pieces of rock and

[16] Loc. cit. p. 451.

* Bull. Geol. Soc. Amer., Vol. 2, p. 199.

boulders commonly are used to fill up space room between the timbers and the wall. It is evident that an implement lying loose behind the timbering of an old mine can not be accepted as indicating great antiquity.

Implements from the Marshall Mine.—Human relics are reported by Whitney from the Marshall mine near San Andreas, Calaveras County. The published statement[17] is in the form of an affidavit, as follows:

San Andreas, Calaveras County, California,
January 3rd, 1871.

"This is to certify that we, the undersigned, proprietors of the gravel claims known as Marshall & Company's, situated near the town of San Andreas, do know of stone mortars and other stone relics, which had evidently been made by human hands, being found in these claims, about the years 1860 and 1869, under about these different formations:

1. Coarse gravel	5 feet
2. Sand and gravel	100 feet
3. Brown gravel	20 feet
4. "Cement" sand	4 feet
5. Bluish volcanic sand	15 feet
6. Pay gravel	6 feet
	150 feet

The above (mentioned relics) were found in bed No. 6."

(Signed) R. D. HUBBARD,
JOHN SHOWALTER.

The writer visited this locality and talked with Mr. J. C. Marshall, who was a part owner in the mine with Hubbard and Showalter. The mine is situated on the top of a hill a few hundred feet northwest of the Calaveras County Hospital in the outskirts of San Andreas. The hill is capped by a gravel of the inter-volcanic epoch, partly overlain on the southwest side by a small area of andesitic breccia. There are no outcrops of rhyolite tuff visible, but the tuff appears on many of the old mine dumps and is probably the "bluish volcanic sand" of the section. The pay gravels are probably inter-rhyolitic.

[17] Aurif. Grav. p. 274.

According to Mr. Marshall, the implements were found by hired men at the time when he was employed as mine boss. He claimed to have seen them in place in the pay gravels close to the bed-rock. One of the mortars had several holes in it and would weigh, he thought, two or three hundred pounds. It was too heavy to hoist out by the whim and was left in the drift. He did not remember how far they were from the bottom of the shaft from which the drift started. The workings have caved in and are inaccessible.

On the top of the hill, in the immediate vicinity of the old Marshall shaft, there are several large blocks of quartz and granodiorite with one or more mortar holes worked in each. At least one of the mortars from the Marshall mine was of this recent type, although said to occur beneath the rhyolite tuff. There are a number of old shafts on the hill, all more or less caved in, so that it is quite possible that the implements, and especially the large permanent mortar fell down one of these shafts, to be afterward struck by the Marshall drift.

The Clay Hill Skeleton.—The discovery of a human skeleton in the gravels on Clay Hill, in the vicinity of Placerville, Eldorado County, is vouched for by Dr. H. H. Boyce. The following extract is from a letter by Dr. Boyce published by Whitney:

"Clay Hill is one of a series of elevations which constitute the water-shed between Placerville Creek and Big Cañon, and is capped by a stratum of basaltic lava, some eight feet thick. Beneath this there are some thirty feet of sand, gravel and clay. The country-rock is slightly capped on this, as on most of the elevations, the slope being toward the center of the hill. Resting on the rock and extending about two feet above it, was a dense stratum of clay. It was in this clay that we came across the bones. While emptying the tub, I saw some pieces of material which on examination I discovered were pieces of bones; and, on further search, I found the scapula, clavicle, and parts of the first, second and third ribs of the right side of a human skeleton. They were quite firmly cemented together; but on exposure to the air began to crumble."

On examination the geological features of Clay Hill were found by the writer to differ in several respects from the above de-

scription. No basalt capping appeared either on the hill or anywhere in the vicinity. There is a small area of andesitic breccia on the top of the hill, but this is not very well exposed in the sections afforded by the old placer mines. Most of the hill is capped by an andesitic gravel, beneath which there is, in some places, a light gray tuffaceous sand, containing frequent small andesite pebbles. The pay gravels beneath the sand are not remarkably quartzose and seem to grade into the andesitic material above mentioned. The lithology of the gravels resting on bedrock can not be satisfactorily studied owing to the heavy talus slopes. For this reason the position of the clay supposed to contain the bones can not be confirmed.

The impression conveyed by the part of the letter quoted is that the skeleton found by Dr. Boyce was at a depth of thirty-eight feet, in undisturbed strata under eight feet of so-called basalt. There is nothing, however, in the letter to show that this was the section passed through in sinking the Boyce shaft. The skeleton may have been found in such a place and at such a depth in the clay that the possibility of recent interment would have to be considered. As the evidence is presented, we are not justified in regarding the skeleton from Clay Hill as of great antiquity.

The Calaveras Skull.—The history of this famous relic is so well known that it is not necessary to repeat at length the details regarding it. The nature of the matrix and filling of the skull present evidence of a geological nature sufficient to settle once for all that it did not come from the gravel as had been supposed.

The skull first came into prominence in 1866 when it was forwarded by Dr. Jones to the office of the state geologist in San Francisco. Regarding its discovery by Mr. Mattison and its subsequent history, Whitney made the following statement:*

"Mr. Mattison, on being questioned, stated that he took the skull from his shaft in February, 1866, with some pieces of wood found near it, and, supposing that it might be something of interest, carried it in a bag to the office of Wells, Fargo & Co.'s Express, at Angels, and gave it to Mr. Scribner, the agent.

"Mr. Scribner's clerk cleaned off a portion of the encrusting

* Aurif. Grav., p. 268.

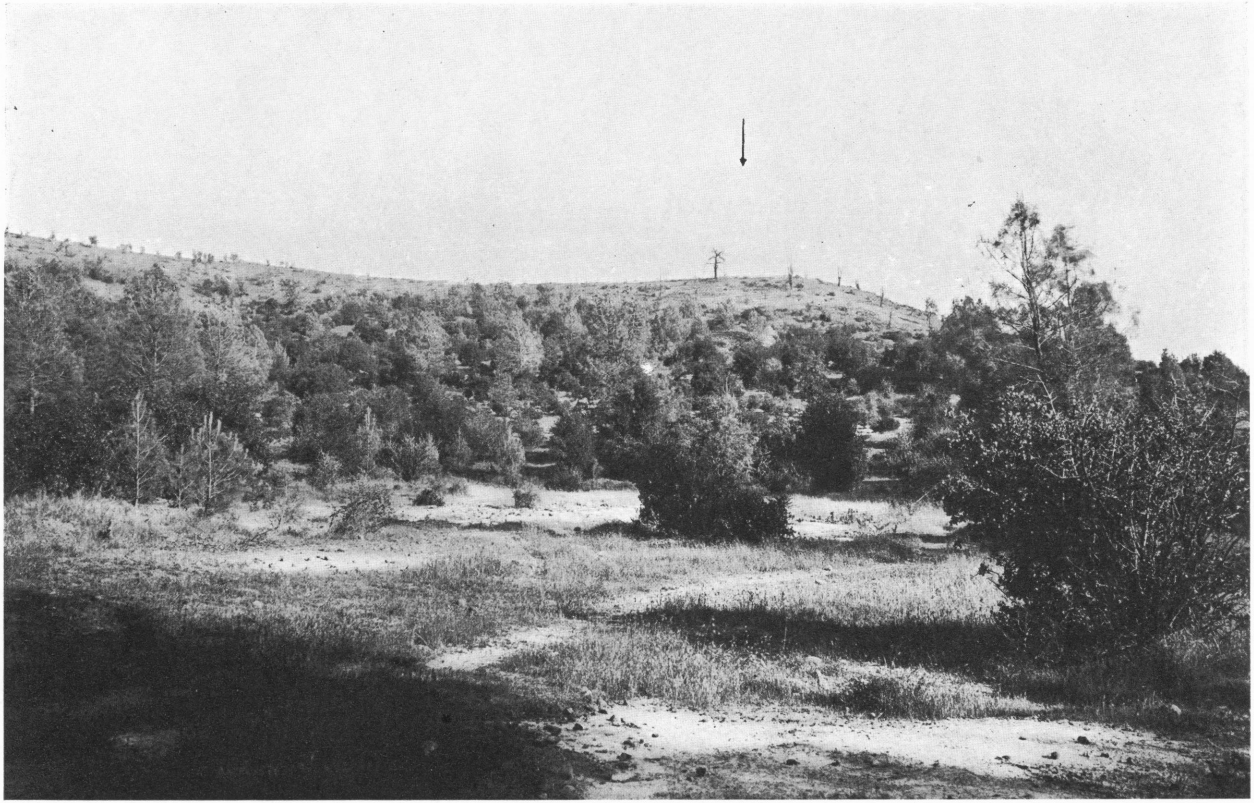
material, discovered that the article in question was a human skull, and, shortly after, gave it to Dr. Jones, ... and in his possession it remained for some months before it was placed in the writer's hands."

Bald Hill (plate 13) is a rather prominent hill rising a little more than one hundred feet above its base. It forms part of a ridge extending about half a mile toward the northeast, where it merges with a table-like expanse capped by an andesite flow. The top of the entire ridge to the contact with the andesite is occupied by a mass of gravel containing andesite pebbles as well as numerous pebbles of vein quartz, quartzite, granodiorite, various porphyrites, etc. Beneath these gravels are rhyolite tuffs, shown in the photograph, on the lower slopes, as white patches among the trees. The upper gravels lie unconformably on the tuff, occupying depressions eroded in the latter. To the northeast, they disappear beneath the andesite flow. These particulars can be gained, in part only, from the Jackson Folio of the United States Geological Survey Atlas, which does not show the gravels lying above the rhyolite. These upper gravels belong to the intervolcanic epoch. They are thoroughly water-worn.

The pay gravel which has been worked by various cuts, shafts and tunnels lies beneath the rhyolite tuff, and may be seen in place in the walls of a cut at the southwest end of the hill. The pebbles are largely quartz, amphibolite and schists of the Calaveras formation with an occasional porphyrite, and with the exception of the quartz are quite thoroughly decomposed. They are inclosed in a fine clayey matrix composed largely of rhyolitic ash. In color they are a pale greenish tint. These gravels belong to the rhyolitic epoch. They are exposed in the cut to a thickness of about a foot. Bedrock may be seen a few yards to the southwest, but the contact of the gravel with the bedrock is concealed in the cut by mine dump and talus. There is no trace of calcareous or ferruginous cementation. The pebbles are flatter than those of the upper gravel, but are equally water-worn.

The following section is given by Whitney,[18] as that passed through by Mattison in sinking the shaft on Bald Hill:

[18] Aurif. Grav. p. 269.



Bald Hill, looking south. The Mattison shaft is about half way up the slope, almost immediately below the large pine tree on the top. Arrow points to shaft.

1.	Black lava	40 feet
2.	Gravel	3 feet
3.	Light lava	30 feet
4.	Gravel	5 feet
5.	Light lava	15 feet
6.	Gravel	25 feet
7.	Dark brown lava	9 feet
8.	Gravel	5 feet
9.	Red lava	4 feet
10.	Red gravel	17 feet
	Total	153 feet

The various "lavas" are difficult to identify, and are probably not correctly determined. The "black lava" is a rhyolite darker in color and harder than the common white tuff. The shaft was started in this rock a few feet below the contact of the rhyolite tuff and the overlying gravels. The skull is said to have been found "in bed No. 8, just above the lowest stratum of lava."

The matrix of the skull is described by Whitney[19] as follows:

"When delivered into the writer's hands its base was imbedded in a conglomerate mass of ferruginous earth, water-worn pebbles of much altered volcanic rock, calcareous tufa, and fragments of bones. This mixed material covered the whole base of the skull and filled the left temporal fossa, concealing the whole of the jaw. A thin calcareous incrustation appears to have covered the whole skull when found; portions of it had been scaled off, probably in cleaning away the other material attached to the base.

"Nothing was done to the skull to alter its condition in any way, after it came into the writer's hands, until it had been examined by Dr. Wyman, when we together carefully chiselled off the foreign matter adhering to its base . . . . . .

"In cutting away the mixed tufa and gravel which covered the face and base, several fragments of human bones were removed; namely one whole and one broken metatarsal; the lower end of a left fibula, and fragments of an ulna, as well as a piece of a sternum. These bones and fragments of bone might have belonged to the same individual to whom the skull had appertained; but, besides these, there was a portion of a human tibia

[19] Aurif. Grav. p. 268.

of too small size to be referred to the same person. There were also some fragments of the bones of a small mammal. Under the malar bone of the left side a small snail shell was lodged, partially concealed by one of the small human bones which was wedged into the cavity. This shell was recognized by Dr. J. G. Cooper as *Helix mormonum,* a species now existing in the Sierra Nevada. Cemented to the fore part of the roof of the mouth was found a circular piece of shell four tenths of an inch in diameter, with a hole drilled through the center, which had probably served as an ornament. Several very small pieces of charcoal were also found in the matter adhering to the face of the skull."

Through the kindness of Professor F. W. Putnam of Harvard University, the writer has been able to examine a portion of the gravel removed by Professor Wyman from the skull, and also the skull itself. Both gravel and skull still bear traces of the wax with which the latter was coated as a preservative. The matrix is not strictly speaking a gravel nor does it show any trace of wear or rounding by stream action. It is composed of angular fragments of white marble (dolomite), decomposed diabase, amphibolite and white vein quartz cemented by a ferruginous calcareous deposit. Small masses of limonite and ochreous clay are present in vacuities in the stalagmite. Small grains of hematite were also detected. Fragments of charcoal and small portions of the shell of a land snail adhere to the stalagmite. The material is dissimilar in every respect to either of the gravels exposed on Bald Hill. In every respect it is comparable to a cave breccia. The association of rock species and the stalagmitic cementation is the same as that found in the breccias on the floors of many caves in Calaveras county which the writer has examined. The lack of agreement between the gravels on Bald Hill and the matrix of the skull effectually establishes the fact that the skull was not obtained in place, as claimed, in the gravels beneath the rhyolite, or from any other gravel of the rhyolitic epoch. None of these gravels exhibit any trace of stalagmitic cementation.

The cave origin of the skull is strengthened by the animal remains and works of art associated with it. In addition to the

Mortuary chamber in a cave above Cave City, Calaveras County. The remains of several individuals are shown. (Flashlight.)

bones of a smaller human individual, there was with the skull a shell bead and the bones of a small mammal. Imbedded in the stalagmite investing fragments of the breccia received from Professor Putnam, the writer found the incisor tooth of some small mammal, possibly a bat or a mole, and an amphicoelous vertebra of a small amphibian. This material is not complete enough for generic determination, but there is no reason for regarding the remains as those of extinct forms. The shell bead has been examined by several archaeologists, who state that it is similar to those found on many Indian sites of the coast region of California.

The scarcity of vertebrate fossils in the auriferous gravels is well known to all geologists familiar with these deposits. The abundance of bones, human and animal, associated with the skull is remarkable in the light of the supposed career depicted by Whitney for this relic before it was finally imbedded in the gravels of a Neocene river.* The effect of even a moderate amount of stream action would be to scatter rather than to collect the various parts of a skeleton. The smaller bones would inevitably be ground to powder. The larger bones should show traces of abrasion rather than fresh fracture as is the case.

The caves of Calaveras County present conditions similar to those indicated by the matrix and remains associated with the Calaveras skull. Many of them have served as Indian mortuaries. A good illustration of one of these will be found on plate 14. A heterogeneous mixture of human remains similar to that shown in this photograph would account for the association of the bones of two individuals with the skull. The human bones found in these caves are often coated with stalagmite and have lost the greater part of their organic matter. Animal remains are commonly present in the earth and breccia on the cave floors. Shells of *Epiphragmophora* (*Helix*) are almost always present.

It is supposed by some that the Calaveras skull came originally from Salt Spring Valley. Holmes[20] states on the authority of Mr. George Stickle of Angels, that the skull, together with a companion specimen, had been placed on exhibition in Stickle's store by Dr. J. I. Boone, who obtained it in an Indian burial ground

* Aurif. Grav. p. 272.

[20] Smithsonian Rept., 1899; Am. Anth., p. 634.

in Salt Spring Valley. There are no deposits in the Valley resembling the matrix of the skull. On the Tower-Bisbee ranch there are yellow gravels containing subangular and also well rounded pebbles derived from the rocks in the immediate vicinity (diabase, porphyrite, amphibolite and slate). More or less ferruginous cementation has taken place. These gravels are either very late Pleistocene or recent. No fragments of marble were found in any of these deposits, nor are any limestones mapped[21] in this vicinity.

Most of those who regard Salt Spring Valley as the place of origin of the skull, agree in stating that it was found in Dead Man Spring. This is a large boggy hole from which between thirty and forty human skulls were taken by Mr. Hetic in 1854. The spring waters are largely alkaline. The mud filling the spring is black, deriving its color from decomposing vegetable matter. The soil about the spring where not in contact with the water, is red and contains angular fragments of amphibolite and vein quartz. The bones were imbedded in the spring mud and are described by Mr. Hetic as black. South of Dead Man Spring there is another alkaline spring in the vicinity of which angular blocks of quartz and amphibolite are coated with a small amount of calcareous tufa inclosing fragments of the same rocks.

It is not the object of the present paper to determine certainly the original place of burial of the skull.* The writer has re-

[21] Jackson Folio, U. S. G. S. Atlas.

* The following note which Professor Putnam has kindly furnished, brings out particularly the fact that the Calaveras skull described by Whitney is not certainly to be identified with any of the skulls which may have been used in attempts to deceive Mr. Mattison or others:

"In 1897 the 'Calaveras Skull' came into the possession of the Peabody Museum from the estate of Professor Whitney, who had expressed the wish that the skull, with all the material pertaining to it, should be given to the Peabody Museum for permanent preservation. I soon realized the importance of making a comparison of the matrix taken from the skull by Professors Whitney and Wyman with the gravel from the Mattison shaft. At my request, early in September 1900, Professor Richard E. Dodge visited Bald Hill for the purpose of obtaining gravel from the layer in which the skull was said to have been taken by Mattison, but the shaft was full of water and the gravel could not be obtained. Mr. Dodge heard several stories relating to the skull such as those that have been reported by Professor Holmes and Mr. Sinclair.

"On September 26-29, 1900, I was in Angels with the hope of making arrangements to have the water pumped from the shaft, but I soon found out that even if this were possible it would be a very long and expensive operation and I therefore abandoned the attempt. While making my examination on Bald Hill I secured the assistance of a Mr. Lee, who had been employed

ceived a letter from Rev. W. H. Dyer of Los Angeles inclosing a clipping from the "Tuolumne Independent" of September 14th, 1901, in which it is stated, over Mr. Dyer's signature, that he was in Scribner's store in Angels, "probably near the year 1876 and found Dr. Walker and Mr. Scribner and another whose coming, after long absence, brought the three old friends together . . Prominent in interest was the story of the skull, which they had planted deep in the bottom of the shaft where it astonished the miner, the curious public and the wondering scientists." In his letter, Mr. Dyer states that he has received a communication from Mrs. Jamison, the sister of John C. Scribner, now living in Tarrytown, New York, to the effect "that they have long known as a joke of his, the planting of a skull in a mine."

Negative Evidence of a General Character.

The occurrence in the older auriferous gravels of human remains indicative of a state of culture and a degree of physical

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on the latest working of the shaft, and he pointed out, on the old dump, the several layers of gravel through which the shaft was sunk, and samples were gathered from the different portions of the dump.

"Again in September, 1901, I visited the place with Professor Merriam, but the water still prevented our entering the shaft. While at Angels and at Murphys I heard many stories, from various persons, and received several letters, to the general effect that a skull had been placed in the shaft for Mr. Mattison to find. To my mind the most interesting point of these stories is that two and possibly three distinct skulls were brought into the stories. One man said the skull was black and enclosed in black earth and that it came from Salt Springs valley, where a dozen or more were found. Mr. Stickle, on the contrary, told me that the skull was whole and white. When I showed Mr. Stickle the photograph taken by Mr. Rhodes of the skull that Professor Whitney received from Dr. Jones (showing the skull before the matrix was removed) Mr. Stickle was very emphatic in his statement that it was not the skull brought out of the shaft by Mattison.

"It would seem therefore that there is a possibility that the skull given to Dr. Jones and by him to Professor Whitney was never in the shaft. Had it been taken from the shaft there probably would have been some trace of gravel, such as is found in the beds through which the shaft was sunk, mixed with the material taken from the skull by Professors Whitney and Wyman, but no such gravel has been found in the several examinations which have been made of the matrix.

"When all the facts now known are carefully considered it seems probable that the skull which came into Professor Whitney's hands, through Dr. Jones, was from some cave or rock crevice in the vicinity of Bald Hill, and that, without any attempt at deception on the part of Dr. Jones, and without any intention on the part of any one to deceive the members of the Geological Survey, the skull was sent to the Survey by Dr. Jones with the belief that it was the skull which, he had been told, Mattison found in his shaft."

Department of Anthropology,
University of California, Dec. 5, 1907.

F. W. Putnam.

development equal to that of the existing Indians of the Sierra Nevada would necessitate placing the origin of the human race in an exceedingly remote geological period. This is contrary to all precedent in the history of organisms, which teaches that mammalian species are short-lived. In North America, there are abundant remains of the lower mammals preserved in deposits ranging from the Eocene to the Pleistocene. In all these deposits, excepting those of late Pleistocene age, the remains of man or any creature directly ancestral to man are conspicuously absent. No remains of the Anthropoidea (from which man is doubtless derived), are known on this continent.

The age of the gravels antedating the latite flows can not be definitely fixed until their flora has been studied. According to Lindgren,[23] "the deep gravels are probably of Eocene or Eomiocene age. The bench gravels and the rhyolite tuffs are probably of late Miocene age. The age of the gravels of the intervolcanic erosion epoch and of the andesite tuff is not established beyond doubt, but these probably belong to the early Oligocene or late Miocene." It has been shown on the preceding pages that a large proportion of the implements reported from the gravels are from those of the rhyolitic and intervolcanic epochs. This would mean that man of a type as high as the existing race was a contemporary of the three-toed horse and other primitive forms of the late Miocene and early Pliocene, a thesis to which all geological and biological evidence is opposed.

Conclusions.

A review of the evidence favoring the presence of the remains of man in the auriferous gravels, compels one to regard it as insufficient to establish the fact. On the preceding pages, it has been shown either that there have been abundant opportunities for the relics in question to be mixed with the gravels accidentally, or that the geological conditions at the localities are such as to render it improbable that the implements and bones have been associated in the gravels to the extent supposed.

[23] Colfax Folio, U. S. G. S. Atlas. Descriptive Text, pp. 5 and 6.

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See also a department circular, "The Department of Anthropology," University of California, 1905, p. 16, where a statement is made of the results of studies in connection with the Calaveras skull. It was stated that the matrix surrounding the skull is unlike the auriferous gravel but is like material from caves.

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